WEEKLY BULLETIN

CALIFORNIA STATE DEPARTMENT OF PUBLIC HEALTH

ESTABLISHED APRIL 15, 1870
BERTRAM P. BROWN, M. D., Director

STATE BOARD OF PUBLIC HEALTH

DR. A. ELMER BELT, President
Los Angeles

DR. F. M. POTTENGER, SR., Vice-President
Los Angeles

DR. BERTRAM P. BROWN, Executive Officer
Sacramento

DR. V. A. ROSSITER
Santa Ana

DR. NORMAN F. SPRAGUE
Los Angeles

DR. CHARLES E. SMITH
San Francisco

DR. AMOS CHRISTIE
San Francisco

ENTERED AS SECOND-CLASS MATTER FEB. 21, 1922, AT THE POST OFFICE AT SACRAMENTO, CALIFORNIA, UNDER THE ACT OF AUG. 24, 1912. ACCEPTANCE FOR MAILING AT THE SPECIAL RATE OF POSTAGE PROVIDED FOR IN SECTION 1103, ACT OF OCT. 3, 1917

SACRAMENTO, STATE OFFICE BLDG., 10TH AND L STS., 2-4711 SAN FRANCISCO, 603 PHELAN BLDG., 760 MARKET ST., UN 8700 LOS ANGELES, STATE OFFICE BLDG., 217 W. FIRST ST., MA 1271

VOL. XX, No. 38 OCTOBER 11, 1941 GUY P. JONES
Editor

Medical
NOV 6 - 1941
University of California

NOISE IN INDUSTRY

There have never been so many activities in the development of industry in California as at the present time. Since most of these industries involve work with metals there are more opportunities for industrial noises to damage the hearing apparatus of workers. The subject has been given considerable space in "Occupation and Health," and the following extracts provide definitions of industrial noises together with suggestions relative to the application of prophylactic measures. It is believed that this material is of sufficient importance that it should be given careful attention upon the part of health officers of all cities where industrial noises have increased greatly during the recent preparations for National defense.

"The influence of noises on the health of workers is one of the most important problems of industrial pathology, for it concerns nearly every modern industry. The study of industrial noises is of comparatively recent date, and the increasing interest which it arouses is accounted for particularly by the increase in industrial noises, and partly by a better realization of their harmful effect, and of the waste of energy which they cause.

Noises consist of a more or less rapid succession of sounds, irregular in periodicity and intensity. Sound, properly so called, is, on the contrary, uniform, steady, and without variations in its constituent parts. All noises may be referred to pure musical sounds, for they are similarly constituted with regard to intensity, pitch, and tone. The study of noises as a cause of occupational disability, however, should be kept distinct from the study of traumatic lesions brought about by explosions, since these sudden concussions of the air cause direct lesions.

Industrial noises include

1. Musical sounds, properly so called, that is, where sonorous metals are beaten, as where copper boilers and other copperware articles are wrought. More or less pure sounds, however, rarely occur alone.
2. Noises, properly so called.
3. Tremors of varying intensity affecting the ground and the bones of workers, due to the vibration of machinery. Although these tremors are sometimes accompanied by the production of fairly loud noises, these noises can not as a rule be regarded as excessive. The decisive factor is the number of sound waves per second, and it is difficult to decide if it is the ear by itself, or the whole body which detects the sound or vibration.

Noise in industry is due to many things, such as the running of machinery, and to actions effected by machines; to vibration and din caused by parts of machines; to transmission gear, such as defective driving belts, or bad running; to such tools as hammers and saws; and to manipulation and transport of material.

Noises act by the intensity, pitch, and tone. The most intense are the most injurious. The expression oftentimes used of "dull noise," "slight noise," "great noise," only give a vague description; but it is comparatively easy to determine experimentally the relative intensity of industrial noises which are regular, and more or less continuous, by comparing them with other noises of constant intensity. It is known that the sensitiveness of the ear varies with the pitch of the sound. At higher and lower limits, the sensitiveness rapidly diminishes. It is a fact that sounds of high pitch, shrill and very shrill, but not necessarily very loud, produce more lesions than the low, deep sounds. The din in boiler making works is more injurious than the roaring in cotton spinning mills. The reports of small caliber artillery and machine guns is more injurious than the booms of big guns. The pitch is more difficult to estimate than the intensity, but it may be estimated by comparison with sounds of a known pitch.

Tone, in combination with pitch, gives to certain noises the particularly disagreeable character which distinguishes them, such as the rasping and rattling sound of flints, or the grating of saws or files. When the tone is of such a painful nature, it is very important, owing to the injurious influence it exerts on people of nervous temperament. Tone may easily be distinguished, with considerable accuracy. It is tone which makes it possible to pick out different machines in motion without seeing them.

To these fundamental characteristics of noises must be added other harmful factors. First, there is the time that the sounds last. That is, the exposure to noises. The noises that last the longest are the most harmful, and in the noisy trades the workmen who suffer most are those who have been exposed to the noise for the longest time.

Rhythm is also an important factor in the harmful nature of industrial noise. Noises that vary in intensity and are uncertain and irregular as to the moment of their production, are more harmful than constant humming sounds, to which one may learn to get accustomed. The suddenness with which some short, loud noises burst out, has a very disagreeable effect on the nervous system. Sounds, otherwise of the same variety are much more important to the ear when they are sudden, intermittent, periodical, or more or less irregular.

Account must also be taken of the resonance and reflection of noise. Work within closed walls is more injurious than work in the open air, as hammering inside a boiler.

Many factors contribute to the injuries caused by noises and vibration, and they often act concurrently. All the trades in which workers are most exposed to lesions of the middle ear or of the nasal pharynx, and constitute in themselves a risk to the integrity of the hearing, are more harmful if the noises are on an equality. Some experts, however, consider that such lesions of the middle ear as suppurations, and sclerosis, by preventing the passage of the deep tone waves into the internal ear, act as a protection; and some authorities consider that those who have healthy ears suffer the most. Fatigue plays an important part in the effect of noise, and the accompanying irritation, in that persons of lowered physical or nervous health are unable to bear up under continuous loud noises.

Among predisposing factors, the effect of dust must also be mentioned. The effect of such poisonous substances as mercury, carbon bisulfide, and especially lead, irritant or acid vapors, smoke, and poisonous gases, show a predilection for the terminations of the auditory nerves. Excessive changes in temperature and pressure also are predisposing factors to ear injury.

The injurious action of noises acts on the system in two ways: Transmission by ear, and bone transmission. Transmission by ear is the principal way, as shown by clinical observations and experience. The most intense and most acute noises, which are also the most injurious, travel by this path. Ears which are stopped up or protected, remain unharmed, and show no lesion from this type of noise. Transmission by bone of pure noises is of very slight importance. But transmission through the frame becomes of importance when noise is simultaneously conducted by sound waves through the air, and by vibration through the skeleton. It has been remarked that workmen most frequently affected with occupational deafness always present the possibility of transmission of vibrations by the skeleton; for example, blacksmiths. Obviously, in comparison to the effect of tremors, when noise predominates, transmission through the frame assumes still greater importance when the vibrations and tremors constitute the chief factor. The hearing is then rapidly and seriously affected. The body of the workmen in contact with the vibrating ground, and particularly the bony framework from the feet to the head, constitute favorable conductors for the transmission of tremors. It is probable that in practice the two kinds of transmission play parts varying in importance with each particular case.

Injuries due to noises and vibrations are of two kinds: (1) the effect on the hearing; and (2) the effect on the nervous system. The symptomatology of auditory affections includes chronic degenerative neuritis of the cochlea, and the affections are serious in proportion to the length of time the workman has worked at a noisy occupation.

Nervous affections are due essentially to functional disorders of the central nervous system caused by mechanical lesions from noises and vibrations. The effect of noises is not as well known as that of light, heat, or ventilation, and it is sometimes difficult to determine if it is the hearing alone, or the whole body which vibrates. It follows that the ill effects caused by sound are not easily distinguished from nervous exhaustion resulting from direct vibration. It is of value to know that noise, even though of slight intensity, causes a marked diminution in capacity for work, and a diminution of output which may fall as low as 40 per cent of the normal.

Prophylactic measures applicable to workmen must be taken to protect the hearing. The best type is the ear tampon of compressed wool, moistened with some greasy substance, such as vaseline. It is necessary to remove such tampons from time to time to allow ventilation, and to let out the warm air from the ear. Numerous ear protectors have been made, but the metal kinds, which may break and allow fragments to penetrate into the interior of the ear, should be avoided. Protective helmets are only a last resort, for men dislike wearing them in that they interfere with the usual methods of work, or are uncomfortable on account of their weight or pressure. They also diminish the perception of unusual noises, or warning shouts, and constitute an extra cause of danger. Further protection to workmen is ensured by the use of substances which isolate the vibrations by wearing boots with soft walls, or by insulating the machinery from the floor, on rubber cushions or springs. In addition to the control measures to be used in the plant, these prophylactic means must be completed by the following measures:

(a) Preemployment medical examination, which enables a selection to be made, and the elimination of workmen affected by diseases of the auditory apparatus. In this way those particularly disposed can be excluded from the most harmful workshops.

(b) Periodical medical inspection of workmen in noisy occupations.

(c) Medical treatment, making it possible to deal with affections at their very beginning.

(d) Measures relating to organization of the work, such as changes of shifts, changes of occupations, or simply change of process in the same occupation. Another useful measure consists in the institution of periods of rest. In some very noisy work, it is recommended that a short interval of rest from the noise be allowed every 15 to 30 minutes.

The measures for the control of noises given above are applicable to the workmen personally, in that they aim to diminish the harmful effect of noises. There are measures, however, which can be used which aim at the suppression or diminution of noises and vibrations prior to reaching the worker. Walls, ceilings, and floors can be covered with antinoise materials such as felts, acoustical plasters, and by special insulation of machinery. Isolation of noisy processes is also of value in reducing the number of workers exposed to noises.''

RELAPSING FEVER REPORTED

A case in a vacationist who had recently returned from Northern California was investigated. He had been bitten by a tick, but it was impossible to determine exactly where the infection was contracted. A survey was made in a San Joaquin Valley County in conjunction with representatives of the United States Public Health Service and a number of ticks were collected for testing, in order to determine whether infected or not. The site where the ticks were collected was the same as that where a stockman contracted relapsing fever a year ago.

TRICHINOSIS SURVEY CONTINUED

During the month of September 495 swine diaphragms were examined for the presence of trichina, of which 1.6 per cent were positive; eight specimens of market pork products were examined, of which none was found trichinous. Portions of five human diaphragms were examined, of which one, or 20 per cent, was found trichinous. A total of 217 ranches were inspected by personnel of the Trichinosis Survey. Three precipitin tests for trichinosis were performed and two vials of trichina antigen for intradermal tests were distributed. This concludes the active field work of this survey. A summary of the activities of this survey will be submitted in a later report.

FOOD SANITATION ACT ENFORCED

A wholesale baker in Los Angeles was recently instructed to clean all equipment, premises and machinery at once, because of their filthy condition. A reinspection 10 days later revealed total disregard of instructions. A citation was issued and the defendant was fined $100.

Fruit canneries which are not under the Cannery Inspection Act were subjected to inspections under the Sanitation Act. In one establishment, stagnant water and putrid fruit pulp under a platform led to a gross violation of the law. Orders were given to clean up immediately.

Restaurants in a Sacramento river town were found infested with cockroaches and old wooden sinks were in use. Orders were issued to replace with metal sinks and to clean up the premises inspected.

Among other places where the Food Sanitation Act was inforced were a pickle factory, noodle factory, soda fountains, butcher shops and other retail food dispensing places.

ENCEPHALITIS (EPIDEMIC)

Investigations into epidemic encephalitis were made by the Bureau of Epidemiology in three different localities of the State during September. In one community three cases, two of which were in migratory laboring camps, were investigated. All gave a history of having been bitten by mosquitoes. None of the cases was fatal. In another community nine cases in children were investigated. One in a child of nine proved fatal. One case was contracted in Arizona and the patient was ill upon arrival. Another patient had contact with sick chickens and several patients had lived in localities where equine encephalitis had been present in horses. There were many mosquitoes in the vicinity.

PURE DRUG ACT

Mislabeling and adulterating of products investigated during September under the Pure Drug Act totaled 60 in number. They involved stomach remedies, athlete's foot cures, ''mineral'' products, biologics (with expired dates) held without refrigeration, substandard milk of magnesia, glandular products, venereal disease ''cures,'' abortion remedies for cattle, skin ointments, cough syrups and systemic tonics. Official samples of laxative drugs, particularly in the San Francisco and Los Angeles areas, revealed a lack of required information, such as adequate directions for administration, indicated dosage for small children and warning relative to pathological conditions which continued use might provoke.

MORBIDITY

Complete Reports for Following Diseases for Week Ending October 4, 1941

Chickenpox

148 cases from the following counties: Alameda 47, Contra Costa 1, Fresno 9, Kern 3, Lassen 1, Los Angeles 24, Merced 2, Monterey 3, Orange 3, Plumas 3, Riverside 2, Sacramento 3, San Diego 5, San Francisco 16, San Joaquin 3, San Luis Obispo 7, San Mateo 2, Santa Clara 2, Shasta 2, Siskiyou 1, Sonoma 5, Ventura 1, Yuba 3.

German Measles

42 cases from the following counties: Alameda 7, Los Angeles 15, Monterey 5, Orange 1, Sacramento 1, San Bernardino 2, San Diego 3, San Francisco 5, San Luis Obispo 1, Santa Barbara 2.

Measles

93 cases from the following counties: Alameda 4, Kern 3, Lassen 3, Los Angeles 16, Monterey 13, Napa 1, Orange 1, Sacramento 1, San Diego 6, San Francisco 6, San Joaquin 5, San Luis Obispo 7, Santa Clara 2, Shasta 1, Sonoma 13, Tulare 2, Ventura 7, Yolo 1, Yuba 1.

Mumps

411 cases from the following counties: Alameda 24, Fresno 2, Kern 16, Lassen 28, Los Angeles 94, Monterey 11, Orange 22, Riverside 3, Sacramento 14, San Bernardino 11, San Diego 45, San Francisco 23, San Joaquin 48, San Luis Obispo 7, San Mateo 6, Santa Barbara 13, Santa Clara 5, Santa Cruz 11, Shasta 1, Solano 3, Sonoma 9, Ventura 13, Yolo 2.

Scarlet Fever

85 cases from the following counties: Alameda 2, Fresno 2, Kern 2, Los Angeles 44, Marin 1, Monterey 2, Orange 7, Sacramento 2, San Diego 3, San Francisco 2, San Joaquin 1, San Mateo 1, Santa Clara 4, Shasta 1, Sonoma 10, Tulare 1.

Whooping Cough

231 cases from the following counties: Alameda 22, Contra Costa 1, Fresno 9, Kern 5, Los Angeles 63, Monterey 2, Orange 7, Riverside 6, Sacramento 6, San Bernardino 2, San Diego 42, San Francisco 13, San Joaquin 7, San Luis Obispo 3, San Mateo 3, Santa Barbara 13, Santa Clara 2, Santa Cruz 6, Sonoma 3, Sutter 7, Trinity 2, Ventura 7.

Diphtheria

11 cases from the following counties: Colusa 1, Fresno 1, Imperial 1, Los Angeles 6, Riverside 1, Tulare 1.

Dysentery (Bacillary)

5 cases from the following counties: Fresno 2, Los Angeles 1, Monterey 1, Ventura 1.

Encephalitis (Epidemic)

12 cases: Fresno County 1 (Mendota); Kern County 3 (Buttonwillow 1, Bakersfield rural 1, Delano 1); Kings County 4 (Armona 1, Hanford rural 2, Stratford 1); Madera County 1 (Madera); Napa County 1 (Monticello); Sutter County 1 (Yuba City rural); Tulare County 1 (Tulare rural).

Food Poisoning

4 cases from the following counties: Los Angeles 3, Marin 1.

Jaundice (Epidemic)

3 cases from Los Angeles County.

Malaria

5 cases from the following counties: Kern 1, San Joaquin 2, Yolo 1, California 1.*

Meningitis (Epidemic)

One case from Tulare County.

Poliomyelitis

6 cases: Kern County 2 (Delano rural 1, Bakersfield 1); Los Angeles County 2 (Inglewood 1, Los Angeles 1); San Francisco 1; Ventura County 1 (Oxnard rural).

Rabies (Animal)

3 cases from Los Angeles County.

Tetanus

5 cases from the following counties: Los Angeles 4, Sonoma 1.

Typhoid Fever

11 cases from the following counties: Imperial 1, Los Angeles 1, Sacramento 2, Shasta 1, Stanislaus 1, California 5.*

Typhus Fever

2 cases from Los Angeles County.

Undulant Fever

10 cases from the following counties: Butte 1, Imperial 3, Kern 2, Los Angeles 2, Santa Clara 1, Siskiyou 1.

MUSSEL QUARANTINE

Owing to continued toxicity of the mussels along the coast, it was made necessary to continue the quarantine beyond the usual time of termination, September 30. The restriction on clams, however, was removed.

LEPROSY INVESTIGATED

A check was made during September on two cases of leprosy in Japanese brothers, aged 8 and 11. The rest of the family, including the father and four children, were examined for evidence of infection. The mother was sent to the National Leprosarium in 1934.

TYPHUS FEVER

A case in Los Angeles was investigated during September. The patient, aged 60, had a positive test. The onset was September 11 and he entered the hospital September 19. The family lived under insanitary conditions and the home was infested with bedbugs. The patient was employed on a hog ranch where there were many rats, giving ample opportunity for contact with rat fleas.

LEMON JUICE SUBSTITUTE

In connection with inspections of alcoholic beverages by the Bureau of Food and Drug Inspection, samples have been taken of a lemon flavored beverage base for the manufacture of so-called lemon juice. The product contained lemon juice, lemon, orange, olive oils, citric acid and gums. It is used commonly in certain mixed drinks, although the use of the imitation product is without the customer's knowledge. About 200 cases of the product were quarantined and the manufacturer agreed to relabel the product as imitation lemon flavored base.

---

* Cases charged to "California" represent patients ill before entering the State or those who contracted their illness traveling about the State throughout the incubation period of the disease. These cases are not chargeable to any one locality.

University of California
Medical Library,
3rd & Parnassus Aves.,
San Francisco, Calif.

printed in CALIFORNIA STATE PRINTING OFFICE
SACRAMENTO, *1941* GEORGE H. MOORE, STATE PRINTER 5462 10-41 6750